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Procurement Research: Current State and Future Challenges in the Nordic Countries

Procurement
Research

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Abstract

Purpose – The purpose of the study is to map previous and current construction procurement research to further develop the research in the Nordic countries.

Design/Methodology/Approach – Mapping of previous and current research based on search in national database. The analysis is based on research perspectives, empirical contexts and research methods.

Findings – That the blind spots are partly overlapping, but that there is potential for knowledge transfer in some areas. There is also the potential for a Nordic research program on one or several of the blind spots.



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Research Limitations/Implications – The study is limited to PhD and licentiate-thesis reports in Norway and Sweden. Further research should include the other Nordic countries and a more extensive literature review including journal articles to broaden the scope. Findings have implications on collaborative Nordic research initiatives, knowledge transfer and in a longer perspective on the level of procurement knowledge in industry and society.

Practical Implications – Findings provide a base for future research collaborations, initiatives and applications.

Originality/Value – Findings provide a comprehensive understanding of construction procurement research in the Nordic countries, starting with Norway and Sweden. This understanding is needed for developing research collaborations and applications.

Keywords Procurement research, Construction, Mapping, Project governance, Building, Infrastructure

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1. Introduction

The construction industry is characterised by interdisciplinary, fragmented and temporary project organisations and process discontinuities, which make construction highly dependent on governance and procurement. Lately, there has been an increased interest for research in construction procurement, for example on client's procurement strategies (Eriksson *et al.* 2017), on project performance (Ahmad *et al.* 2016), collaborative frameworks (Hosseini *et al.* 2017), supply chain integration (Song *et al.* 2018) and social requirements (Petersen & Kadefors 2018) to mention only a few.

The Nordic countries share several contextual similarities in terms of, for example, public procurement regulations, models for standard contracts, construction industry culture and supplier market. Other aspects of the governance structure differ, as well as the procurement strategies used. This implies that there is considerable potential in comparing procurement research results between the Nordic countries, as well as in integrating and combining research initiatives.

To lay a foundation for Nordic research collaboration on construction procurement, there is a need for a comprehensive overview of both previous and current procurement research. This overview should also identify future challenges for procurement research in the Nordic context. The purpose of this paper is to present such an overview and thereby contribute to the development of construction procurement research. It is a first step in this endeavour and it is limited to research performed in Norway and Sweden.

2. Framework

Mapping this research is complicated by the multitude of concepts and language variations used to express similar or slightly different phenomena, or the same phenomenon seen from different perspectives, not to mention differences between different industries and research communities. To overcome this confusion the mapping reported here is limited to research related directly to three areas: the governance of construction procurement (GP in Tables 1 and 2) which includes political and market level factors that directly or indirectly affect construction procurement, construction procurement as governance tool (PGT in Tables 1 and 2), which includes the client's procurement strategies and practices, and effects of construction procurement (EP in Tables 1 and 2), which includes efficiency, innovation, collaboration, flexibility, sustainability, etc.

These three analytical categories are not mutually exclusive and can, of course, be debated. However, they enable a mapping that covers a multitude of issues/disciplines/research communities that perform research related to construction project procurement. Hence, the three categories support a more holistic understanding. For example, the governance of procurement includes policy research which is relevant for a highly regulated industry. Procurement as governance tool includes management research including the client's strategies and managerial practices. Effects of procurement include a broad range of research on performance, innovation, quality and sustainability.

3. Method

International research on construction procurement is extensive and a literature review using for example Scopus or Web of Science would provide a comprehensive list of published papers. A full literature review is not realistic here and would not show previous and current research projects. Therefore, to fulfil the purpose of this paper, we have limited the search to include published licentiate and PhD thesis reports in Norway and Sweden. The mapping of on-going licentiate and PhD projects is used as indicator of current research. To provide for a more holistic perspective, we also include major research programs. We have searched the databases DIVA (in Sweden) and Cristin (in Norway) and we have consulted our respective national research networks for current and recently initiated projects. For practical reasons, we chose not to go further back than 2010. The findings are analysed and a conclusion presented in terms of strengths, weaknesses, trends and blind spots.

4. Findings

4.1. *Mapping of research perspective, empirical context and research method*

In Sweden (see [Table 1](#)), research has been performed from all three perspectives, however with a dominance from the client perspective. When looking at on-going research in Sweden, there are several research projects on governance of procurement and on combining all three perspectives. Public infrastructure is the dominating main context. One explanation to the dominance of infrastructure is the increase in public investments in infrastructure in combination with the Swedish Transport Administration's role as public funder of research. In addition, the Swedish Transport Administration initiated a major Professional Client Initiative around 2010, which spurred the need for procurement-related research. The type of research methods varied, but the trend in Sweden is towards more qualitative research.

In Norway (see [Table 2](#)), research has been performed from all three perspectives and covered for example effects of procurement on progress, value, communication and collaboration. On-going research is mainly focused on the effects of procurement. The empirical context covers more building projects than infrastructure and occasionally both types. The method used is mostly qualitative.

In Norway, there is a significant increase in large infrastructure projects, which corresponds to continuing high level in the building sector. The large number of PhDs in 2018-2019 in Norway coincides with this. Projects that have increasing potential for loss or gain spurred the motivation by key actors in the construction industry to support such research, for example the Public Roads Authority in Norway.

4.2. *Mapping of disciplines and universities*

Research in Sweden has been performed and is currently performed by several disciplines at several universities. Disciplines include economics, public administration, management,

Table 1.
Previous and
On-going Lic/PhD
in Sweden

<i>Lic/PhD Finished 2010-2018 SWE</i>									
<i>Author, Year, Title, Department, University</i>	<i>(Mgmt = Management)</i>	<i>GP</i>	<i>PGT</i>	<i>EP</i>	<i>Infra</i>	<i>Building</i>	<i>Qual</i>	<i>Quant</i>	<i>Mixed</i>
Abidi (2011(Lic)). <i>Technical and contractual aspects in winter highway and railway operation and maintenance: a survey of current technical systems and contract forms in Sweden</i> , Transport Studies, KTH			X	X	X				X
Hansson (2011). <i>Public procurement at the local government level: Actor roles, discretion and constraints in the implementation of public transport goals</i> , Thematic Studies, LiU		X	X		X				
Lundman (2011). <i>Cost management for underground infrastructure projects a case study on cost increase and its causes</i> , Mining and Geotechnical Engineering, LTU			X	X	X				X
Uttam (2011 (Lic)/ 2015). <i>Linking environmental impact assessment and green procurement in the construction sector: opportunities and perspectives/Seeking sustainability in the construction sector: opportunities within impact assessment and sustainable public procurement</i> , Environment Mgmt, KTH		X	X		X				X
Warsame (2011). <i>Construction cost - central concepts, categories and determining factors</i> , Real Estate and Construction Mgmt, KTH			X	X				X	
Lundström (2013). <i>Comparing procurement methods in road construction projects: influence on uncertainty, interaction and knowledge</i> , Business Studies, UU			X	X	X				X
Larsson (2013/2016). <i>Mapping the concept of industrialized bridge construction potentials and obstacles/Managing radical innovation in the Swedish infrastructure sector: a study of industrialized construction</i> , Construction Engineering, LTU			X	X	X				X
Osipova (2013). <i>On enhancing joint risk management throughout a project's lifecycle Empirical studies of Swedish construction projects</i> , Construction Engineering and Mgmt, LTU			X	X	X	X			X
Butt (2014). <i>Life cycle assessment of asphalt roads: decision support at the project level</i> , Transport Studies, KTH		X	X	X	X				X
Lingegård (2014). <i>Life cycle assessment of asphalt roads: decision support at the project level</i> , Environmental Technology, LIU		X	X		X		X		
Sporrong (2014). <i>Selecting architectural and engineering consultants – municipal practices in Sweden</i> , Service Mgmt, Chalmers			X		X	X			X
Borg (2015). <i>Procurement contracts, innovation and productivity in the construction sector: five studies</i> , Real Estate and Construction Mgmt, KTH			X	X		X			X

*Lic/PhD Finished 2010-2018 SWE**Author, Year, Title, Department, University
(Mgmt = Management)*

	<i>GP</i>	<i>PGT</i>	<i>EP</i>	<i>Infra</i>	<i>Building</i>	<i>Qual</i>	<i>Quant</i>	<i>Mixed</i>
Odolinski (2015). <i>Reforming a publicly owned monopoly: costs and incentives in railway maintenance</i> , Economics, ÖU	X	X		X			X	
Adam (2016). (Lic) <i>Managing construction challenges: viability of a dynamic capabilities approach for the public client</i> , Construction Mgmt, Chalmers		X			X	X		
Eriksson (2015). <i>Designing the design organisation - client-consultant coordination in a large infrastructure project</i> , Service Mgmt, Chalmers		X	X	X		X		
Szentes (2017). <i>Organizational tensions when managing interorganizational projects: applying a paradox perspective on large construction projects in Sweden</i> , Construction Engineering and Mgmt, LTH		X	X		X	X		
Vigren (2017). <i>Competition in public transport: essays on competitive tendering and open-access competition in Sweden</i> , Transport Studies, KTH								
Hedborg Bengtsson (2018) (Lic) <i>Construction client collaboration for inter-organizational innovation - do too many cooks really spoil the broth?</i> Real Estate and Construction Mgmt, KTH		X	X			X		
Petersen (2018) (Lic) <i>Let the right ones in? Employment requirements in Swedish construction procurement</i> , Service Mgmt, Chalmers	X	X	X			X		

*Lic/PhD on-going SWE**Author, Department, University
(Mgmt = Management)*

	<i>GP</i>	<i>PGT</i>	<i>EP</i>	<i>Infra</i>	<i>Building</i>	<i>Qual</i>	<i>Quant</i>	<i>Mixed</i>
Aldenlöv, <i>Quality Mgmt, LTU</i>		X	X	X				X
Candel, <i>Real Estate and Construction Mgmt, KTH</i>		X			X	X		
Rosander, <i>Real Estate and Construction Mgmt, KTH</i>	X	X		X		X		
Ekeskä, <i>Real Estate and Construction Mgmt, KTH</i>		X	X		X	X		
Molén, <i>Real Estate and Construction Mgmt, KTH</i>	X	X	X		X	X		
Troje, <i>Service Mgmt, Chalmers</i>	X	X	X	X		X		
Vestola, <i>Construction Engineering and Mgmt, LTU</i>		X	X	X				X
Hedborg Bengtsson, <i>Real Estate and Construction Mgmt KTH</i>		X	X		X	X		
Järvenpää, <i>Construction Engineering and Mgmt, LTU</i>		X	X	X				X
Indell, <i>Construction Engineering and Mgmt, LTH</i>		X	X	X				X

Table 1.
(Continued)

Table 2.
Previous and
On-going Lic/PhD
in Norway

Lic/PhD Finished 2010-2018 NOR Author, Year, Title, Department, University (Mgmt = Management)	GP	PGT	EP	Infra	Building	Qual	Quant	Mixed
Klakegg (2010). <i>Governance of Major Public Investment Projects: In Pursuit of Relevance and Sustainability</i> , Management, Economics, Organization, NTNU	X			x	x			x
Magnussen (2010). <i>Up-Front Assessment and Quality Assurance of Major Investment Projects</i> , Management, Economics, Organization, NTNU	X	X		x	x			x
Krane (2011). <i>Uncertainty Management of Projects from the Owners' Perspective, with Main Focus on Managing Delivered Functionality</i> , Management, Economics, Organization, NTNU			X	X		X		
Welde (2011). <i>Essays on Cost Estimation and their Uncertainties in Transportation Projects</i> , Management, Economics, Organization, Leeds			X	X			x	
Shiferaw (2012). <i>Front-End Project Governance: Choice of Project Concept and Decision-Making. An International Perspective</i> , Management, Economics, Organization, NTNU	X			x	x	x		
Kristensen (2013). <i>Building Design Management – Management of the Cooperative Design and its Interdisciplinary Functions</i> , Construction Engineering and Mgmt, NTNU			X		X			X
Johansen (2015). <i>Project Uncertainty Management: A New approach – The 'Lost Opportunities'. Practical uncertainty management seen from a project joint perspective</i> , Management, Economics, Organization, NTNU	X	X		x	x			x
Haji-Kazemi (2015). <i>The Early Warning Procedure in Projects Foundations, Approaches and Challenges</i> , Management, Economics, Organization, NTNU			X	X				
Meistad (2015). <i>Sustainable Building – From Role Model Projects to Industrial Transformation</i> , Urban Planning, NTNU	X	X			X	X		
Klungseth (2015). <i>Cleaning Services in Local Authorities</i> , Real Estate and Construction Management NTNU			x		X	x	x	
Barathi (2015). <i>Sustainability in Practice: Social Science Perspectives on Architectural Design, Research and the Implementation of Buildings Solutions</i> , Management, Economics, NTNU	X		X		X	X		
Hjelmbrekke (2017). <i>Aligning AEC Projects with Corporate Strategy: Project Governance as a Mean for Strategic Effect</i> , Construction Engineering and Mgmt, NTNU			X		X	X		
Bjordal (2017). <i>Real Estate Development as Strategic Project Management</i> , Real Estate and Construction Mgmt, NMBU		X			X	X		
Knotten (2018). <i>Building Design Management in the Early Stages</i> , Construction Engineering and Mgmt., NTNU			X		X	X		

Lic/PhD Finished 2010-2018 NOR Author, Year, Title, Department, University (Mgmt = Management)	GP	PGT	EP	Infra	Building	Qual	Quant	Mixed
Kinloch (2018). <i>The Facility Management and Building User Interaction in the Delivery of Energy Management Services: Theoretical Approach and Practical Applications for Facility Managers in Non-residential Buildings</i> , Real Estate and Construction Mgmt, NTNU	X				X	X		
Zidane (2018). <i>"Need for Speed" – Insights into the Concept of Time in Managing Large-scale Projects</i> , Management, economics, NTNU		X	X	X	X			X
Svalestuen (2018). <i>Information Flow between Design and Construction in Building Projects</i> , Construction Engineering and Mgmt, NTNU			X	X	X	X		
Hosseini (2018). <i>A New Look towards Relational Project Delivery Methods</i> , Construction Engineering and Mgmt., NTNU		X		X		x		
Lic/PhD on-going NOR Author, Year, Department, University (Mgmt = Management)	GP	PGT	EP	Infra	Building	Qual	Quant	Mixed
Wondimu, <i>Construction Engineering and Mgmt., NTNU</i>	X	X		X				x
Mejl��nder-Larsen, <i>Construction Engineering and Mgmt., NTNU</i>		x		x	X	x		
Haddadi, <i>Construction Engineering and Mgmt., NTNU</i>			X		X			x
Vignisdottir, <i>Real Estate and Construction Mgmt., NTNU</i>		x		X				x
Ahmad, <i>Construction Engineering and Mgmt., NTNU</i>			X	x	x			x
Drevland, <i>Construction Engineering and Mgmt., NTNU</i>		x			X	x		
Holst Volden, <i>Management, economics, NTNU</i>	X			x	x			x
Collins, <i>Real Estate and Construction Mgmt., NTNU</i>		x			x			x
Solheim-Kile, <i>Management, economics, University of Agder</i>		x	X	x	x	x		
��kland, <i>Management, Economics, NTNU</i>		x	X		x	x		
Sabri, <i>Construction Engineering and Mgmt., NTNU</i>		X	X	X		x		
Engebo, <i>Construction Engineering and Mgmt, NTNU</i>		x			X	x		
Nevstad, <i>Construction Engineering and Mgmt., NTNU</i>			X	X		x		
Haaskjold, <i>Management, Economics, Organizatio, NTNU</i>		X		x		x		
Furstenberg, <i>Construction Engineering and Mgmt., NTNU</i>			X	X		X		
Beste, <i>Management, Economics, Organization, NTNU</i>		x	x		X		x	
Tvedt, <i>Management, Economics, Organization, NTNU</i>			x	x	x	X		
Strand Larsen, <i>Management, Economics, NTNU</i>	X				X			

Table 2.
(Continued)

engineering and environmental management and most research have been performed at the four major technical universities.

Construction procurement research in Norway is mainly performed at NTNU in Trondheim. There is also research in the management economics, real estate and organisation theory. The tendency is leaning towards wider spectra in the latest period.

4.3. Research programs with focus on procurement

In Norway, the “KSS-project” (Contract strategies and specialist based collaboration) is the major project directly dedicated to procurement research. In Sweden, most ongoing research is performed within the “ProcSIBE-program”, a national research platform on Procurement for Sustainable Innovation in the Built Environment involving five universities (2014-2020). ProcSIBE is primarily funded by the Swedish research council Formas but involves co-financing also from the Swedish Transport Administration and several other sources.

5. Discussion

5.1. Procurement research in Sweden

Research on construction procurement from 2010 onwards covers a wide range of topics and disciplines, with a high representation of economics, contract and risk in the beginning of the period. In the beginning of the period, research was fragmented with no clear coordination between communities, initiatives or applications, except for VTI, which collaborated on PhDs with several universities. Research projects were directed towards industry needs and possibilities for research co-funding.

In the middle of this period, ProcSIBE was initiated. This has resulted in a broader range of perspectives and better coordination via joint seminars and joint project applications. For example, perspectives of political sciences have been added. Owing to the co-funding by the Swedish Transport Administration there is, however, much focus on public infrastructure clients. Looking at the totality of PhD projects in Sweden, there seems to be an increased focus over time on public clients and governance of procurement. This includes issues such as social sustainability, organising of procurement functions and policy changes.

5.2. Procurement research in Norway

Most research covers project governance and project management and includes wide perspectives and generic frameworks, often covering both building and construction. Looking at the totality of PhD projects in Norway, there seems to be a need for an increase in research on procurement in infrastructure projects. This is because of the rise in the activity in infrastructure in Norway. There is also a need for procurement research in light of the digital shift, and for more research on collaboration, sustainability, trust, technical quality, safety, etc. Most industry parties seem to agree that what happens in “early” stages are of importance, but there is no agreement on when this is.

6. Conclusions

In the following section, we sum up the observations from mapping Swedish and Norwegian construction procurement research. We do this in terms of observed strengths, weaknesses, trends and blind spots. Then, as the last point: what could research across the Nordic region contribute?

6.1. Strengths

ProcSIBE has reduced the knowledge fragmentation in Sweden and began to develop a more coherent knowledge base on construction procurement. The large number of

universities performing research is a potential for strong education in construction procurement. Further, the basic Formas funding also allows for research on subjects that are of general interest to society but more difficult to co-finance by industry.

In Norway, the strengths are found in the long history of research into public project governance and project management. Lately, the fundamentals of value creation together with partnering strategies etc. form a good starting point for further, deeper, more precise studies. In summary, research in Norway has developed deep knowledge about the context for project procurement.

6.2. Weaknesses

Knowledge on procurement in the building and maintenance context, for example housing and healthcare, is a weakness in Sweden. A risk might be the strong focus on the Swedish Transport Administration. While long-term collaboration with one actor is strength, it also includes risk. A too dominant focus on one public infrastructure client limits the possibilities for studies of other actors from other perspectives. Also, the fact that research seems to focus on issues where there is potential for funding is a potential weakness. A potential threat is also that the ProcSIBE program is time limited.

Society (politicians) require a radical shift towards lower cost, better quality, faster delivery, more value creation and improved safety and responsibility in the construction industry. In Norway, the construction research program and the KSS-project have this on the agenda, but it seems too small to fully answer the need for new knowledge. More importantly in the context of this paper - research seems to follow after, not to precede the industry by setting the research agenda.

6.3. Trends

In Sweden, ProcSIBE is growing and procurement-related research gain increased project funding and attention by society and industry. Adding universities and disciplines also enable larger project applications and broader dissemination possibilities. The dominant perspective in Sweden is the public infrastructure client and most focus is on infrastructure investment projects. However, in the past, there was more research on the building sector.

In Norway, there is also a clear tendency to focus the clients' perspective and to do research on infrastructure investment projects. In Norway, the public clients set the research agenda. Private sector has followed as suppliers to public projects. Lately, the parties are addressing issues about how to succeed in delivering better quality, cheaper, faster and safer.

6.4. Blind spots

Combining the mapping in Tables 1 and 2, blind spots seem to overlap making the lack of knowledge in these areas a major problem. Maintenance and buildings are somewhat blind spots in both countries. In addition, public clients of infrastructure gain most attention, partly because their activity is increasing and partly because they provide considerable funding possibilities. However, this also makes them set the research agenda. Blind spots are, thus, a result of lack of attention in combination with lack of funding.

6.5. A Nordic research direction

Based on the mapping, we conclude the following needs and potential:

- (1) A deeper analysis of the identified blind spots in the other Nordic countries. Do the other countries also encounter the same blind spots?

- (2) Investigating if and how blind spots can be researched in collaboration, what funding bodies to approach and if there is a possibility for a joint application for a Nordic program. This way, the research community can take the initiative on what to do construction procurement research on.
- (3) There is a potential in arranging arenas for knowledge transfer. For example, Swedish research is strong in public procurement strategies while the Norwegian research is strong in contextual issues.

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